UNITED STATES PATENT AND TRADEMARK OFFICE

#'A

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/830,004	04/23/2004	Asano Tosiya	03560.003454	7655

5514 7590 08/23/2007

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER	
HOANG, ANN THI	

ART UNIT	PAPER NUMBER
2836	

MAIL DATE	DELIVERY MODE
08/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/830,004	Applicant(s) TOSIYA, ASANO	
	Examiner Ann T. Hoang	Art Unit 2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 June 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boon et al. (US 5,227,948) in view of Nakasuji (US 2002/0121615), Ha et al. (KR 2001065114) and Kikuchi et al. (US 2005/0229690).

Regarding claim 1, Boon et al. discloses a magnetic guiding apparatus for guiding a moving member (5, 9, 21) along the length of a sliding member (1) by attracting a target (1) disposed along the length of the sliding member (1) by electromagnets (13, 15, 17, 19) provided on the moving member (5, 9, 21), said apparatus comprising:

position measuring means (29, 31) for measuring a position of the electromagnets (13, 15, 17, 19) on the guided moving member.

The magnetic guiding apparatus, which may be used for irradiation of semiconductor substrates, also comprises control means (25a, 25b) responsive to position information from said position measuring means (29, 31), which detects a position of the electromagnets (13, 15, 17, 19) and brings them closer to their desired position. The target is along the sliding member (1) and the position measuring means

(29, 31) are fitted into the electromagnets. See abstract; Fig. 1-2; column 4, lines 41-61; and column 5, lines 12-28. The reference does not disclose a plurality of magnetic flux detection means on the guided moving member (5, 9, 21) for detecting a magnetic flux along the length of said target (1) during movement of the moving member (5, 9, 21) along the length of the sliding member (1), a detection means for detecting a position of a magnetic flux peak along the length of the target (1), or demagnetization means. The reference also does not disclose that the position measuring means measures a position along the length of the sliding member (1).

However, Nakasuji discloses a plurality of magnetic field detection means (21) in the form of a search coil for detecting stray floating magnetic fields during manufacturing of microelectronic devices so as to prevent adverse effects of such fields. The plurality of magnetic field detection means (21) would naturally be used to detect magnetic flux, since magnetic flux in an area is a direct product of the magnetic field that penetrates the area. The reference also discloses a plurality of demagnetization means (22) for performing demagnetization at the detected position of the magnetic field. Furthermore, the reference discloses that each of the plurality of magnetic field detection means (21) and the demagnetization means (22) can be combined into a single coil configured to perform both functions in order for the system to be made more compact. See abstract; Fig. 1; and paragraphs 15 and 28. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the plurality of combined coils, which serve as magnetic flux detection means and demagnetization means, in the electromagnets of Boone et al., in order to provide a plurality of means on

the guided moving member (5, 9, 21) for detecting a magnetic flux of the target (1) during movement of the moving member (5, 9, 21) along the length of the sliding member (1) and performing demagnetization in the location of the magnetic flux so as to prevent adverse effects of such fluxes on the system. A plurality of the combined coils would be beneficial in that a larger area or quantity of semiconductor substrates could undergo magnetic flux detection and demagnetization at once. Since the position measuring means (29, 31) of Boon et al. senses the position of the electromagnets (13, 15, 17, 19) and the magnetic flux detection means (21) of Nakasuji would be a coil of an electromagnet (13, 15, 17, 19), then the position measuring means would also be a means for measuring a position of said plurality of magnetic flux detection means (21) on the guided moving member (5, 9, 21).

Ha et al. discloses a magnetic guiding apparatus for guiding a moving member (1) along the length of a sliding member (2) in order to perform demagnetization on a semiconductor package. The direction of movement of the moving member (1) includes a rise and fall direction, controlled by a driving cylinder (5), and also a forward and backward direction along the length of the sliding member (2), controlled by driving cylinder (4), in order to accurately situate the moving member (1) for performing demagnetization on a portion needing demagnetization. See abstract and Figure. This would necessitate position measuring means for measuring a position on the guided moving member (1) along the length of the sliding member (2). It would have been obvious to one of ordinary skill in the art at the time of the invention to include position measuring means for measuring a position on the guided moving member (1) along the

length of the sliding member, as disclosed by Ha et al., in the magnetic guiding apparatus of Boon et al. in view of Nakasuji in order to provide an improved means of positioning the demagnetization means relative to a portion needing demagnetization.

Kikuchi et al. discloses that a large magnetic field occurs in conjunction with a magnetic flux peak. See paragraphs 121, 147, and 177. It would have been obvious to one of ordinary skill in the art at the time of the invention to detect magnetic flux peaks in order to detect strong magnetic fields, as disclosed by Kikuchi et al., along the length of the target of the magnetic guiding apparatus of Boon et al. in view of Naksuji and Ha et al. in order to effectively sense the portions needing demagnetization.

Regarding claim 2, Boon et al. discloses a storing means (69, 71) in the form of digital memory. See Fig. 5. The information of the magnetic flux in the target (1) corresponding to the position measured by said position measuring means would necessarily be stored in said storing means (69, 71) in order to implement signaling for demagnetization in the appropriate locations of the magnetic flux.

Regarding claim 3, said magnetic flux detection means (21) of Nakasuji would be mounted on the moving member (5, 9, 21) of Boon et al., since the magnetic flux detection means (21) would be the coil of an electromagnet (13, 15, 17, 19) provided on the moving member (5, 9, 21). See above rejection on claim 1.

Regarding claim 4, demagnetization would be performed by moving the electromagnets (13, 15, 17, 19) to the position of the magnetic flux. See above rejection on claim 1. The electromagnets (13, 15, 17, 19) would be provided with a current signal by said demagnetization means (22), as Nakasuji discloses the

demagnetization means (22), which would be mounted to an electromagnet (13, 15, 17, 19), to be provided with a current signal. See paragraph 32.

Regarding claim 5, at least one of the electromagnets (13, 15, 17, 19) would be used as said magnetic flux detection means (21), since said magnetic-flux detection means (21) would be the coil of an electromagnet (13, 15, 17, 19). See above rejection on claim 1.

Regarding claim 6, Nakasuji discloses a stage apparatus (41) for holding a substrate (23) during manufacturing of a microelectronic device. See Fig. 1. The reference discloses that the substrate (23) is continuously moving in a lateral direction. See paragraph 30. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the magnetic guiding apparatus discussed above in the stage apparatus of Nakasuji in order to provide an effective means for the substrate to continuously move back and forth so as to expose all the subfields on a reticle to a die on the substrate.

Regarding claim 7, Nakasuji discloses an exposure apparatus for positioning at least one of a substrate (23) and an original (10) by using a stage apparatus (41). See Fig. 1.

Regarding claim 8, Nakasuji discloses a step of manufacturing devices by the exposure apparatus. See Fig. 3-4 and paragraphs 47-48.

Regarding claim 9, Boon et al. discloses a stage apparatus comprising:

a target (1) having a length extending along a direction (x);

a moving member (5, 9, 21) guided by said target (1) and movable along the length of said target (1);

electromagnets (13, 15, 17, 19) provided on said moving member (5, 9, 21) and producing a force between said target (1) and electromagnets (13, 15, 17, 19); and

position measuring means (29, 31) for measuring a position of said electromagnets (13, 15, 17, 19) on said moving member (5, 9, 21).

See abstract; Fig. 1-2; column 4, lines 41-61; and column 5, lines 12-28. The reference does not disclose a plurality of magnetic flux detection means provided on the moving member (5, 9, 21) for detecting a magnetic flux along the length of said target (1) or detection means for detecting the position of a magnetic flux peak along the length of the target.

However, Nakasuji discloses a plurality of magnetic field detection means (21) in the form of a search coil for detecting stray floating magnetic fields during manufacturing of microelectronic devices so as to prevent adverse effects of such fields. The plurality of magnetic field detection means (21) would naturally be used to detect magnetic flux, since magnetic flux in an area is a direct product of the magnetic field that penetrates the area. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the plurality of magnetic field detection means of Naksuji in the electromagnets of Boone et al. in order to provide a means for detecting a magnetic flux of the target (1) during movement of the moving member (5, 9, 21), and in order to determine the location of portions needing demagnetization. A plurality of the magnetic field detection means would be beneficial in that a larger area or quantity of

the semiconductor substrates could undergo magnetic flux detection at once. Since the position measuring means (29, 31) of Boon et al. senses the position of the electromagnets (13, 15, 17, 19) and each of the plurality of magnetic flux detection means (21) of Nakasuji would be a coil of an electromagnet (13, 15, 17, 19), then the position measuring means would also be a detection means for measuring a position of the magnetic flux.

Ha et al. discloses a magnetic guiding apparatus for guiding a moving member (1) along the length of a sliding member (2) in order to perform demagnetization on a semiconductor package. The direction of movement of the moving member (1) includes a rise and fall direction, controlled by a driving cylinder (5), and also a forward and backward direction along the length of the sliding member (2), controlled by driving cylinder (4), in order to accurately situate the moving member (1) for performing demagnetization on a portion needing demagnetization. See abstract and Figure. This would necessitate position measuring means for measuring a position on the guided moving member (1) along the length of the sliding member (2). It would have been obvious to one of ordinary skill in the art at the time of the invention to include position measuring means for measuring a position on the guided moving member (1) along the length of the sliding member, as disclosed by Ha et al., in the magnetic guiding apparatus of Boon et al. in view of Nakasuji in order to provide an improved means of positioning the demagnetization means relative to a portion needing demagnetization.

Kikuchi et al. discloses that a large magnetic field occurs in conjunction with a magnetic flux peak. See paragraphs 121, 147, and 177. It would have been obvious to

one of ordinary skill in the art at the time of the invention to detect magnetic flux peaks in order to detect strong magnetic fields, as disclosed by Kikuchi et al., along the length of the target of the magnetic guiding apparatus of Boon et al. in view of Naksuji and Ha et al. in order to effectively sense the portions needing demagnetization.

Regarding claim 10, Nakasuji discloses demagnetization means (22) for reducing the magnetic field, or magnetic flux, at the detected position of the magnetic field. See paragraph 32. In the combination discussed above, this would occur at the detected position of the magnetic flux peak, as Kikuchi et al. discloses that sensing a magnetic flux peak will indicate a large magnetic field. See paragraphs 121, 147, and 177.

Regarding claim 11, it is well known and expedient in the art to use a servo positioning system for positioning magnetic guiding apparatuses and moving members in general. Furthermore, it is understood that in the system of Nakasuji, some type of positional information would have to be received from the magnetic flux detection means (21) in order to perform demagnetization at the appropriate locations and that the demagnetization performed by demagnetization means (22) would be specific to the positional information. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to deactivate the servo positioning system during a reduction of the magnetic flux in order to avoid interfering with the demagnetization being performed, since the demagnetization would be specific to a position and an active servo would compromise that position.

Regarding claim 12, the recited method steps would necessarily be performed in the usage of the above mentioned magnetic guiding apparatus.

Regarding claim 13, Boon et al. discloses a magnetic guiding apparatus for guiding a moving member (5, 9, 21) along the length of a beam (1) by attracting a target (1) disposed along the length of beam (1) by electromagnets (13, 15, 17, 19) provided on the moving member (5, 9, 21), said apparatus comprising:

a position measuring unit (29, 31) configured to measure a position of the electromagnets (13, 15, 17, 19).

The magnetic guiding apparatus, which may be used for irradiation of semiconductor substrates, also comprises control means (25a, 25b) responsive to position information from said position measuring unit (29, 31), which detects a position of the electromagnets (13, 15, 17, 19) and brings them closer to their desired position. The target is along the beam (1) and the position measuring unit (29, 31) is fitted into the electromagnets. See abstract; Fig. 1-2; column 4, lines 41-61; and column 5, lines 12-28. The reference does not disclose a plurality of magnetic-flux detectors on the guided moving member (5, 9, 21) configured to detect a magnetic flux along the length of said target (1) during movement of the moving member (5, 9, 21) along the length of the target (1), a detection means for detecting a position of a magnetic flux peak along the length of the target (1), or demagnetization means. The reference also does not disclose that the position measuring unit is configured to measure a position along the length of the target (1).

However, Nakasuji discloses a plurality of magnetic field detection means (21) in the form of a search coil for detecting stray floating magnetic fields during manufacturing of microelectronic devices so as to prevent adverse effects of such fields.

The plurality of magnetic field detection means (21) would naturally be used to detect magnetic flux, since magnetic flux in an area is a direct product of the magnetic field that penetrates the area. The reference also discloses a plurality of demagnetization means (22) for performing demagnetization at the detected position of the magnetic field. Furthermore, the reference discloses that each of the plurality of magnetic field detection means (21) and demagnetization means (22) can be combined into a single coil configured to perform both functions in order for the system to be made more compact. See abstract; Fig. 1; and paragraphs 15 and 28. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the plurality of combined coils, which serve as magnetic flux detection means and demagnetization means, in the electromagnets of Boone et al., in order to provide means on the guided moving member (5, 9, 21) for detecting a magnetic flux of the target (1) during movement of the moving member (5, 9, 21) along the length of the sliding member (1) and performing demagnetization in the location of the magnetic flux so as to prevent adverse effects of such fluxes on the system. A plurality of the combined coils would be beneficial in that a larger area or quantity of semiconductor substrates could undergo magnetic flux detection and demagnetization at once. Since the position measuring means (29, 31) of Boon et al. senses the position of the electromagnets (13, 15, 17, 19) and the magnetic flux detection means (21) of Nakasuji would be a coil of an electromagnet (13, 15, 17, 19), then the position measuring means would also be a means for measuring a position of said magnetic flux detection means (21) on the guided moving member (5, 9, 21).

Ha et al. discloses a magnetic guiding apparatus for guiding a moving member (1) along the length of a sliding member (2) in order to perform demagnetization on a semiconductor package. The direction of movement of the moving member (1) includes a rise and fall direction, controlled by a driving cylinder (5), and also a forward and backward direction along the length of the sliding member (2), controlled by driving cylinder (4), in order to accurately situate the moving member (1) for performing demagnetization on a portion needing demagnetization. See abstract and Figure. This would necessitate position measuring means for measuring a position on the guided moving member (1) along the length of the sliding member (2). It would have been obvious to one of ordinary skill in the art at the time of the invention to include position measuring means for measuring a position on the guided moving member (1) along the length of the sliding member, as disclosed by Ha et al., in the magnetic guiding apparatus of Boon et al. in view of Nakasuji in order to provide an improved means of positioning the demagnetization means relative to a portion needing demagnetization.

Kikuchi et al. discloses that a large magnetic field occurs in conjunction with a magnetic flux peak. See paragraphs 121, 147, and 177. It would have been obvious to one of ordinary skill in the art at the time of the invention to detect magnetic flux peaks in order to detect strong magnetic fields, as disclosed by Kikuchi et al., along the length of the target of the magnetic guiding apparatus of Boon et al. in view of Naksuji and Ha et al. in order to effectively sense the portions needing demagnetization.

Response to Arguments

3. Applicant's arguments filed 06/29/07 have been fully considered but they are not persuasive.

4. In response to Applicant's argument, see pages 7-8 of remarks, that Examiner's conclusion of obviousness is based upon improper hindsight reasoning in that Boon et al. does not recognize any problem of magnetic flux and Nakasuji is directed to detecting a magnetic flux in a different apparatus structure than a sliding member, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Boon et al. involves semiconductor substrates and Nakasuji is pertinent to the manufacture of integrated circuits. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention that Nakasuji would benefit Boon et al. in providing protection against adverse effects of magnetic fluxes in the semiconductor or integrated circuit processing environment.

5. Regarding Applicant's argument, see page 8 of remarks, that nowhere do the citations teach or suggest the use of a plurality of detection members, Examiner asserts that Nakasuji discloses a plurality of magnetic field detection means (21), which is clearly evident in Fig. 1. A plurality of the magnetic field detection means would be

beneficial in that a larger area or quantity of the semiconductor substrates could undergo magnetic flux detection at once.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ann T. Hoang, whose telephone number is 571-272-2724. The examiner can normally be reached Monday-Thursday and every other Friday, 8 a.m. to 6 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry, can be reached at 571-272-2084. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ATH
8/20/07

8/20/07

MICHAEL SHERRY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800